

Service Oriented Cloud Computing Architectures

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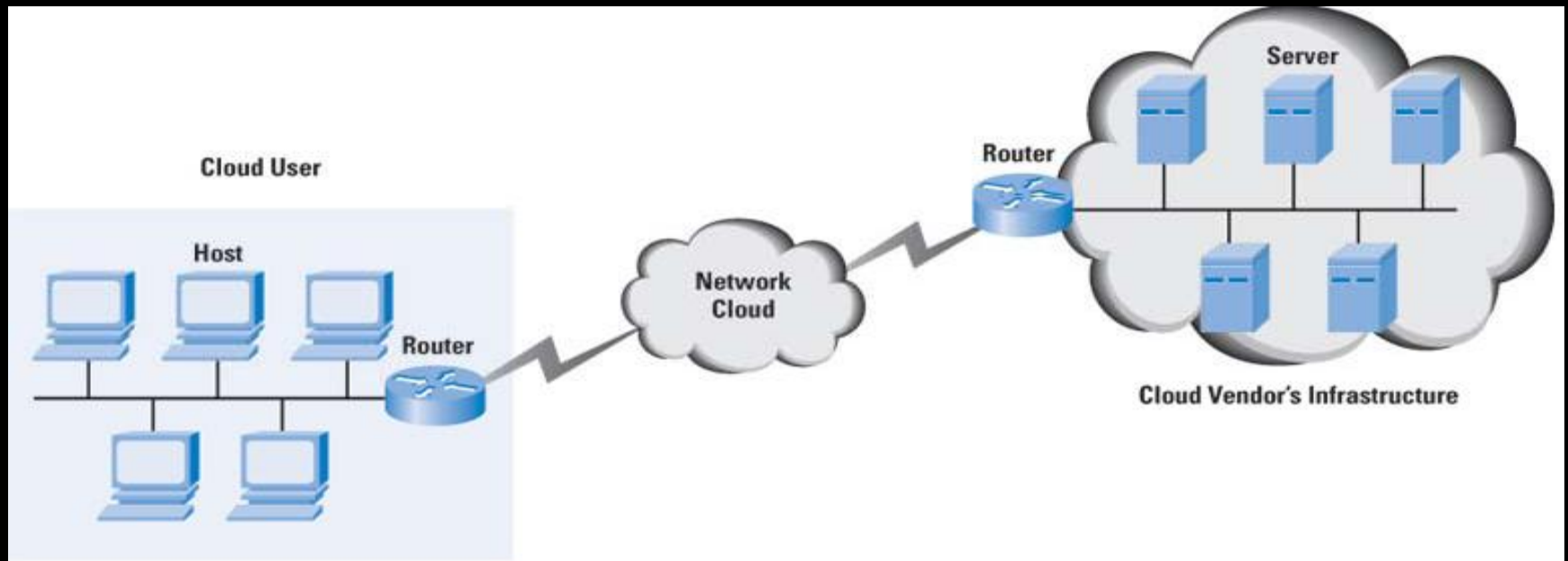
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Overview

- Cloud Computing
 - What is cloud computing
 - Types of cloud computing
- Service Oriented Architecture
- Service Oriented Cloud Computing Architectures
 - Cloud Computing Open Architecture (CCOA)
 - Service Oriented Cloud Computing Architecture (SOCCA)
 - Comparison of CCOA and SOCCA
- Conclusion

Cloud Computing



- Cloud computing: The use of shared computing infrastructure to provide IT services in the form of a large pool of systems that are linked together

Types of Cloud Computing

- SaaS: Software as a Service
 - Providing a software application through the internet
- Qualities
 - No user license
 - Free or pay per use
 - Maintenance free for the users
- Examples of SaaS
 - Gmail
 - Quicken Online

Types of Cloud Computing

- PaaS: Platform as a Service
 - Providing a software platform for users to create, manage and distribute their own applications
- Qualities
 - Pay per use
 - Maintenance free for users
- Examples of PaaS
 - Windows Azure
 - Google AppEngine

Types of Cloud Computing

- IaaS: Infrastructure as a Service
 - Providing computing power and storage for users
- Qualities
 - Pay per use
 - Hardware is maintenance free for users
 - Rents hard drive space, CPU and RAM
 - Users have to care for their own software
- Examples of IaaS
 - Amazon's Elastic Cloud Computing EC2

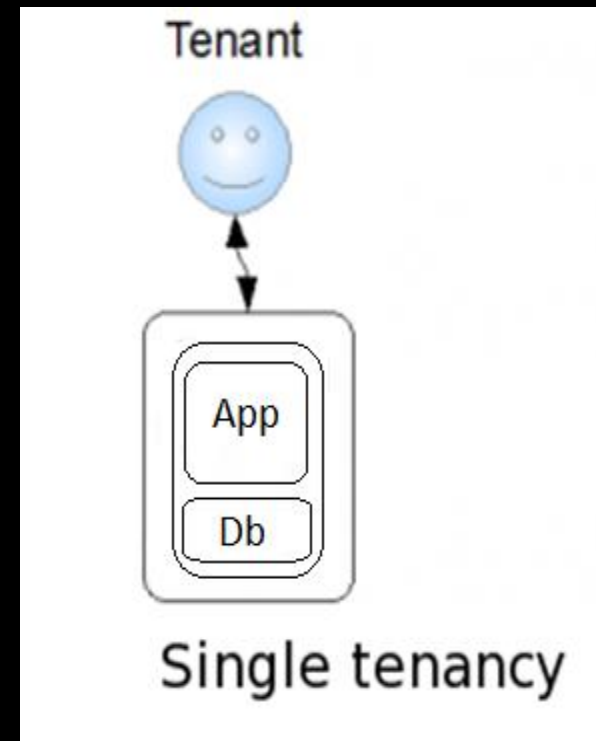
Service Oriented Architecture

- SOA is an architecture that is focused around making the service better for the users
- Requirements
 - The user must be able to switch between different providers and take their information with
 - Example of this is Google allows users to transfer your email from one email to theirs
 - Also web browsers allow you to transfer your bookmarks
 - There must be a want to create a federation of resources

Single Tenancy and Multitenancy

Single Tenancy

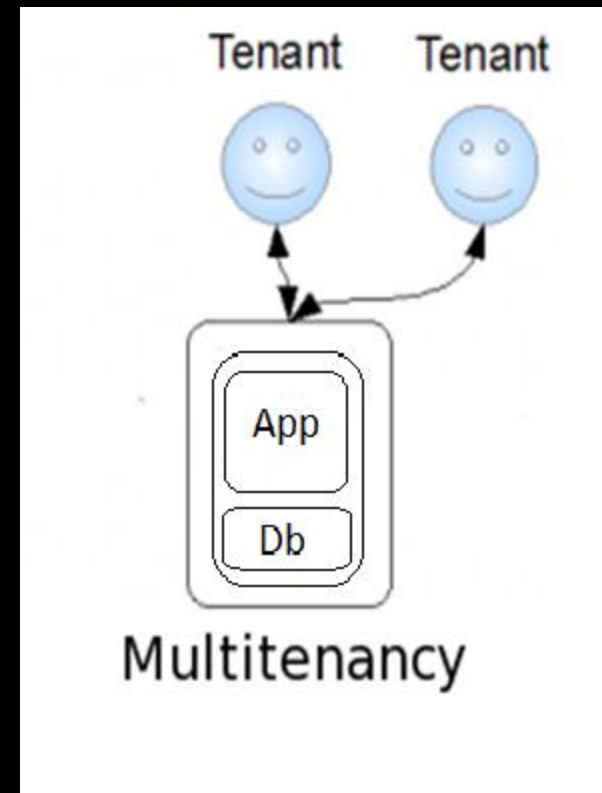
- One user per application instance
- Scales poorly with many users
- Many application instances
- Examples
 - Text editor



Single Tenancy and Multitenancy

Multitenancy

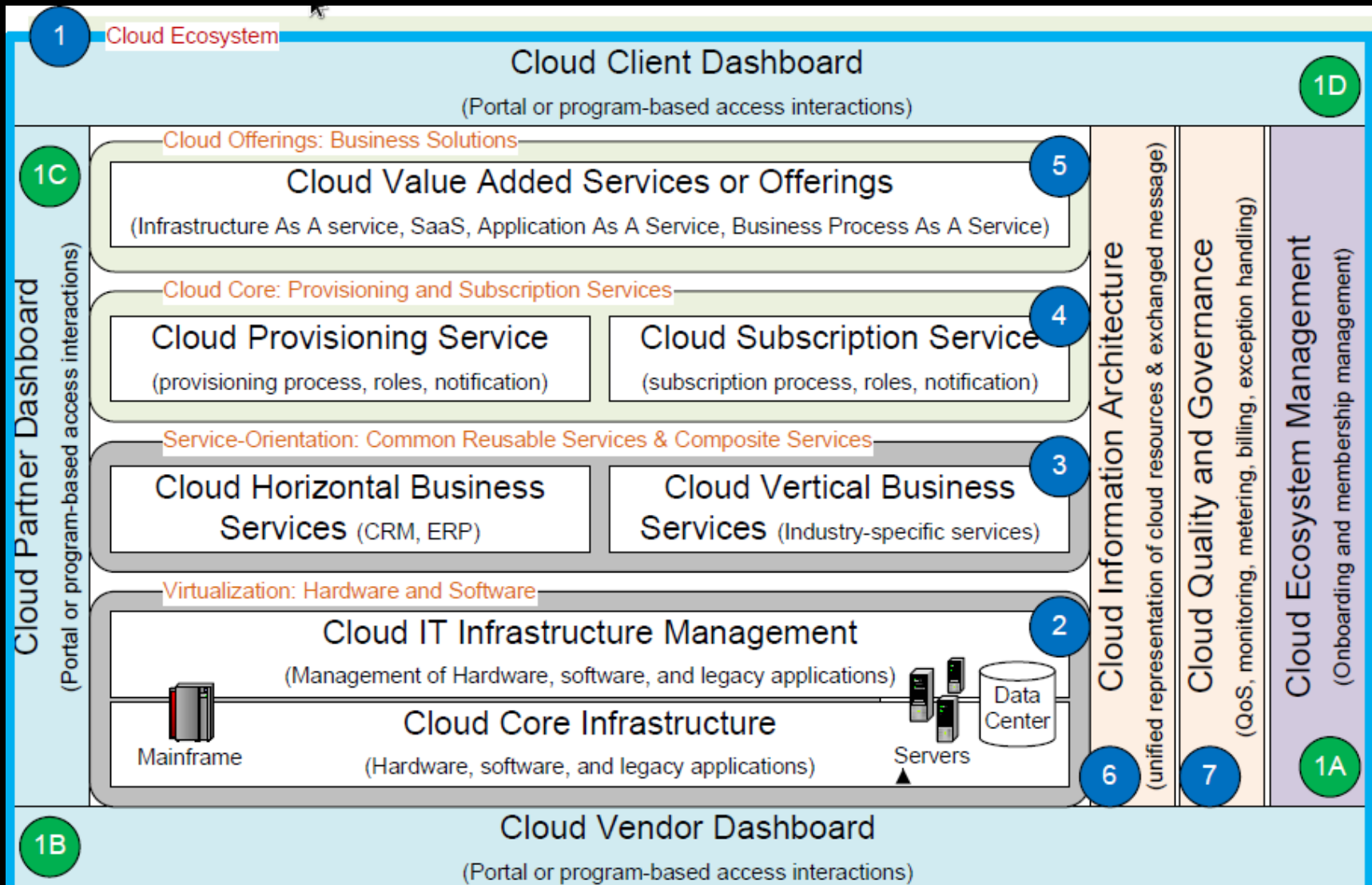
- Multiple users per application instance
- Scales well with many users
- Low number of application instances
- Examples
 - Gmail



Cloud Computing Open Architecture

- CCOA is a service oriented architecture for cloud computing
- Developed by Liang-Jie Zhang who works at IBM
- CCOA is made up of 7 principles that form its architecture

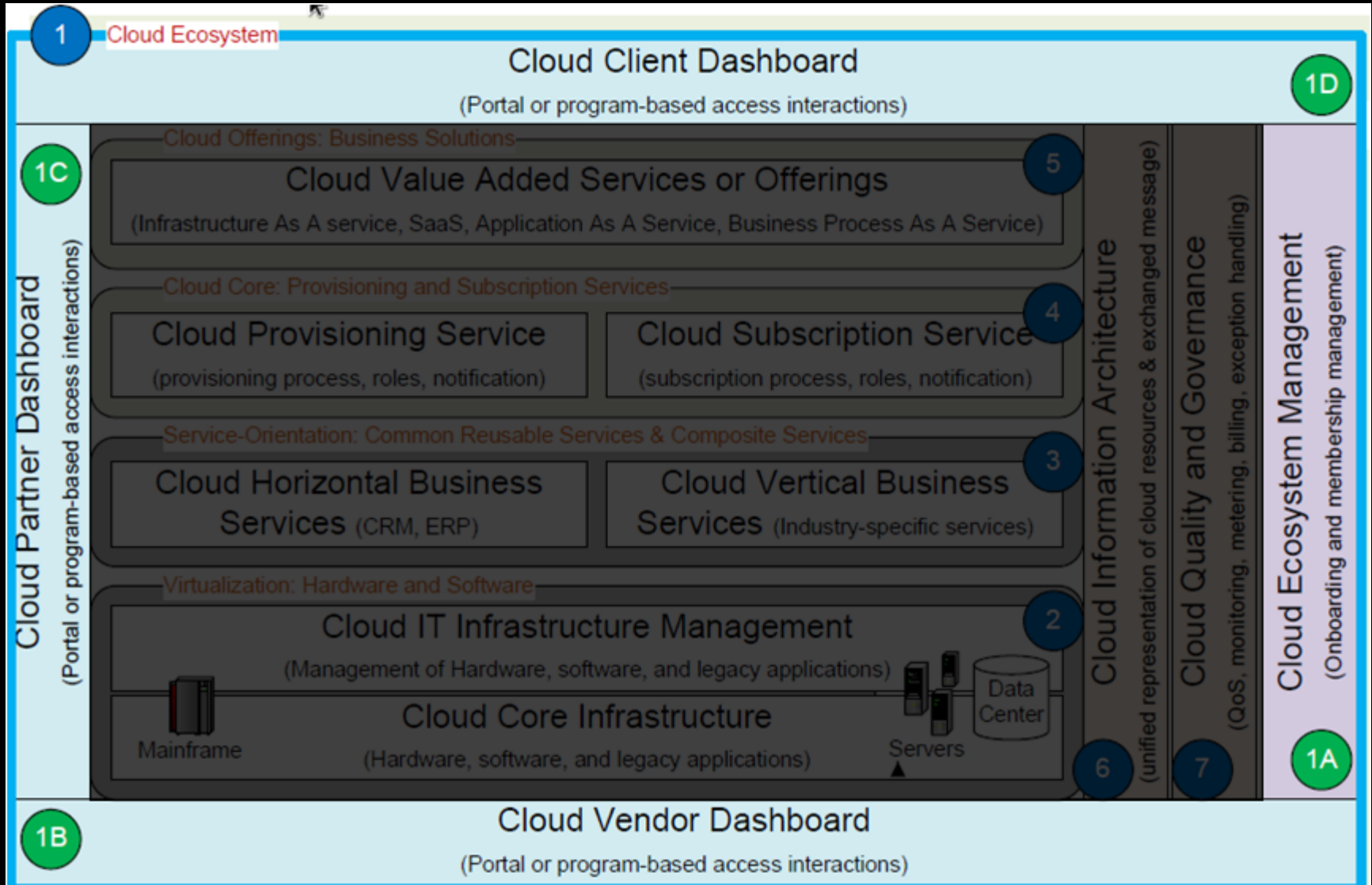
CCOA 7 Principles



CCOA 7 Principles

- Principle 1
 - Integrated ecosystem management, this is the interface for CCOA

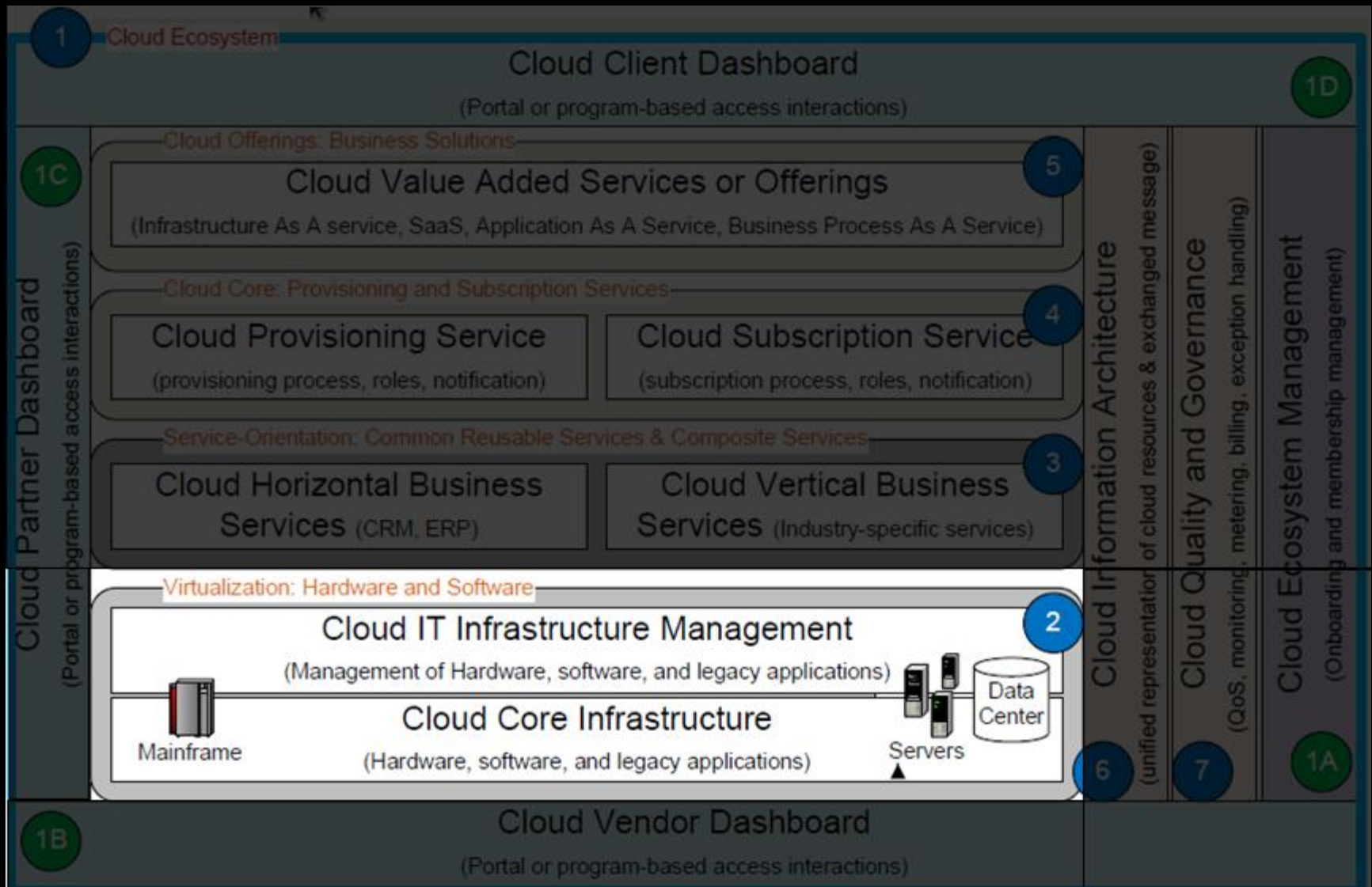
CCOA 7 Principles



CCOA 7 Principles

- Principle 2
 - Virtualization for cloud infrastructure, this deals with resource allocation for the cloud
 - Virtualization: The partitioning of a physical resource and placing an application in that partitioned space

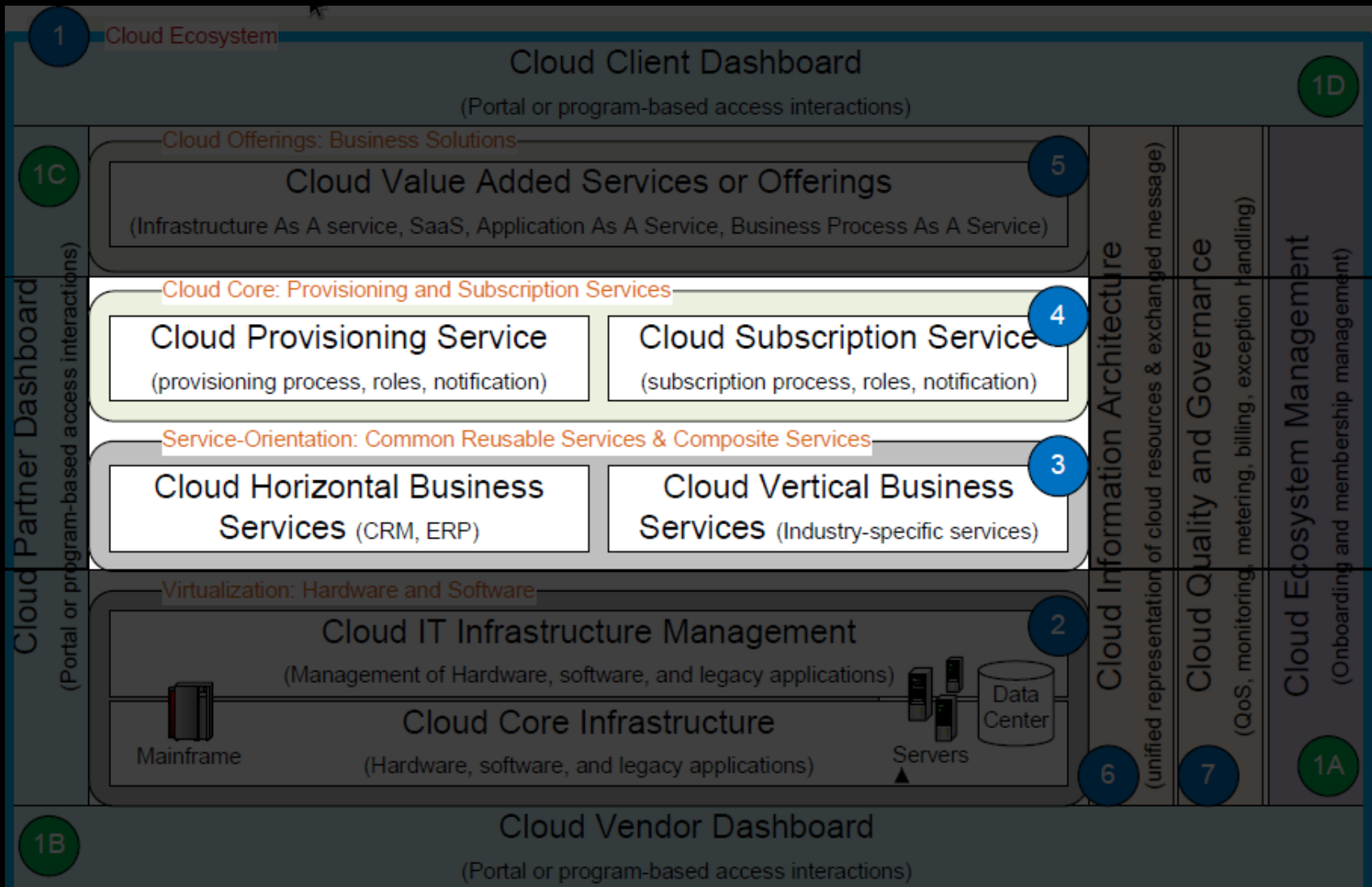
CCOA 7 Principles



CCOA 7 Principles

- Principle 3
 - Service orientation for common reusable services, this deals with simple services that are reusable to make the cloud more efficient
- Principle 4
 - Provisioning and subscriptions for the cloud, this deals with user subscriptions and user status in the cloud

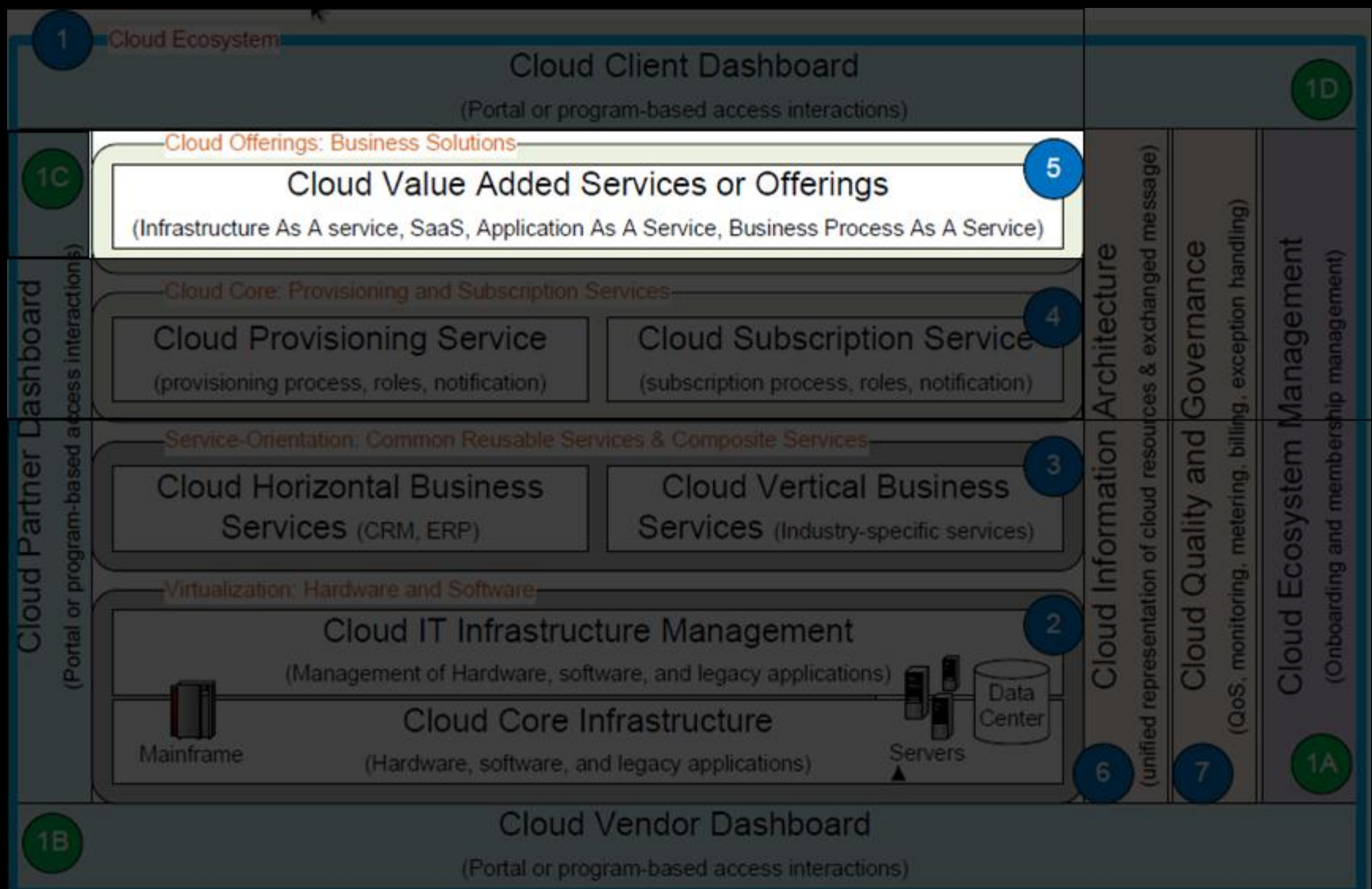
CCOA 7 Principles



CCOA 7 Principles

- Principle 5
 - Configurable enablement for cloud offerings, this deals with the final product of the cloud

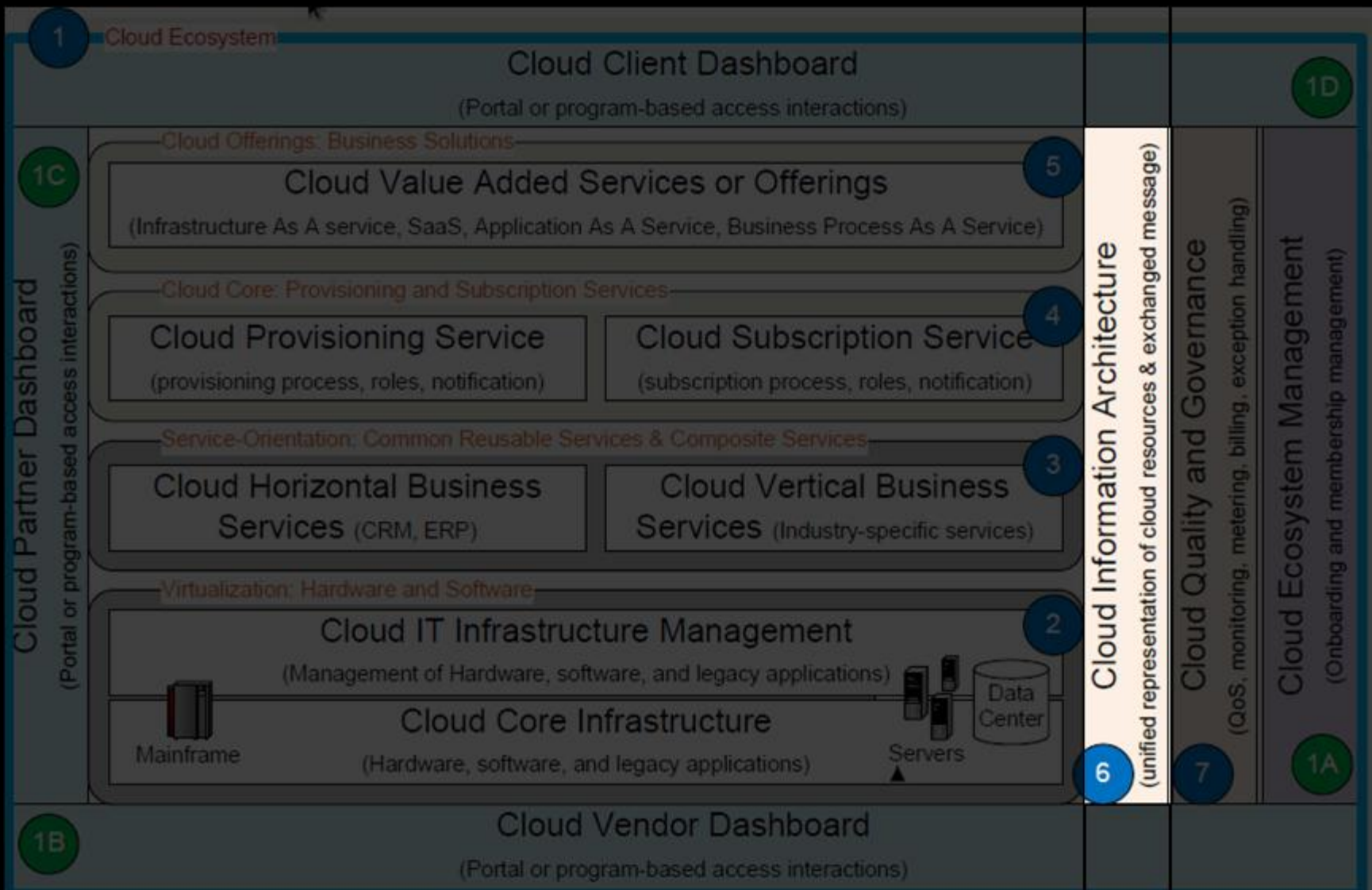
CCOA 7 Principles



CCOA 7 Principles

- Principle 6
 - Unified information representation and exchange framework, this deals with information representation on the cloud

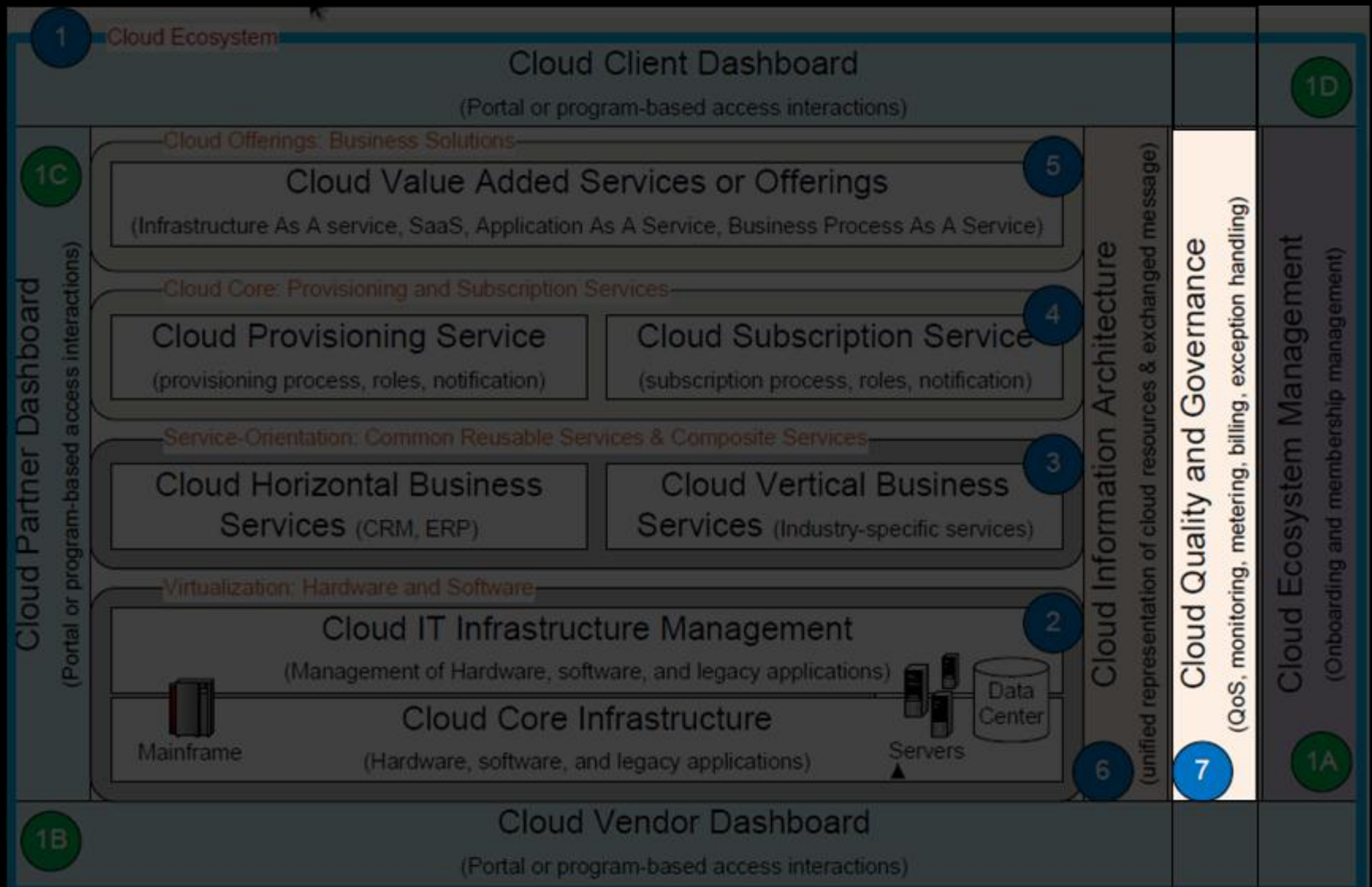
CCOA 7 Principles



CCOA 7 Principles

- Principle 7
 - Cloud quality and governance, this deals with performance measurements and quality of the cloud

CCOA 7 Principles

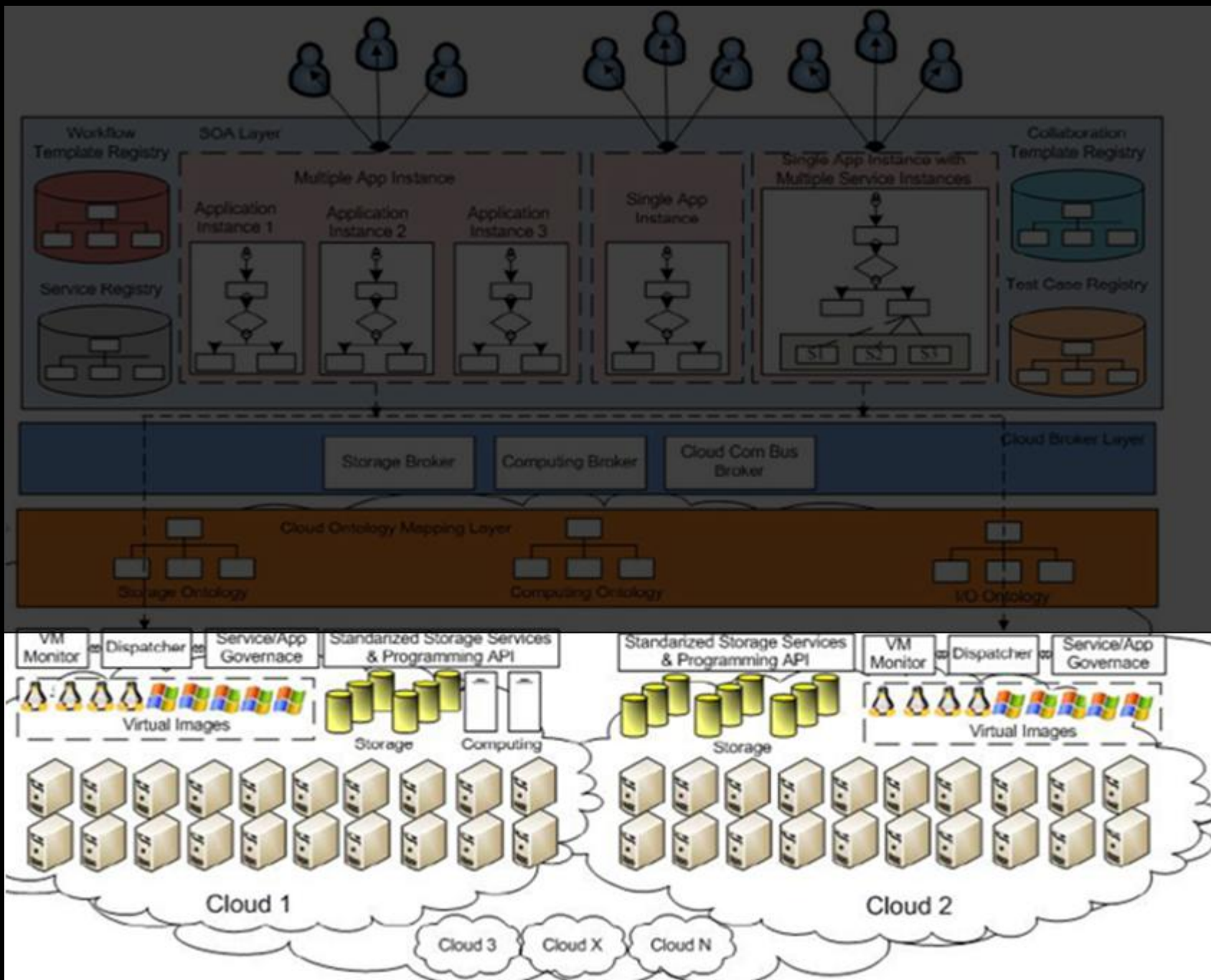


Service Oriented Cloud Computing Architecture

- SOCCA is a theoretical service oriented architecture that is a bit different than CCOA
- SOCCA was created by Wei-Tek Tsai
- SOCCA is comprised of 4 layers

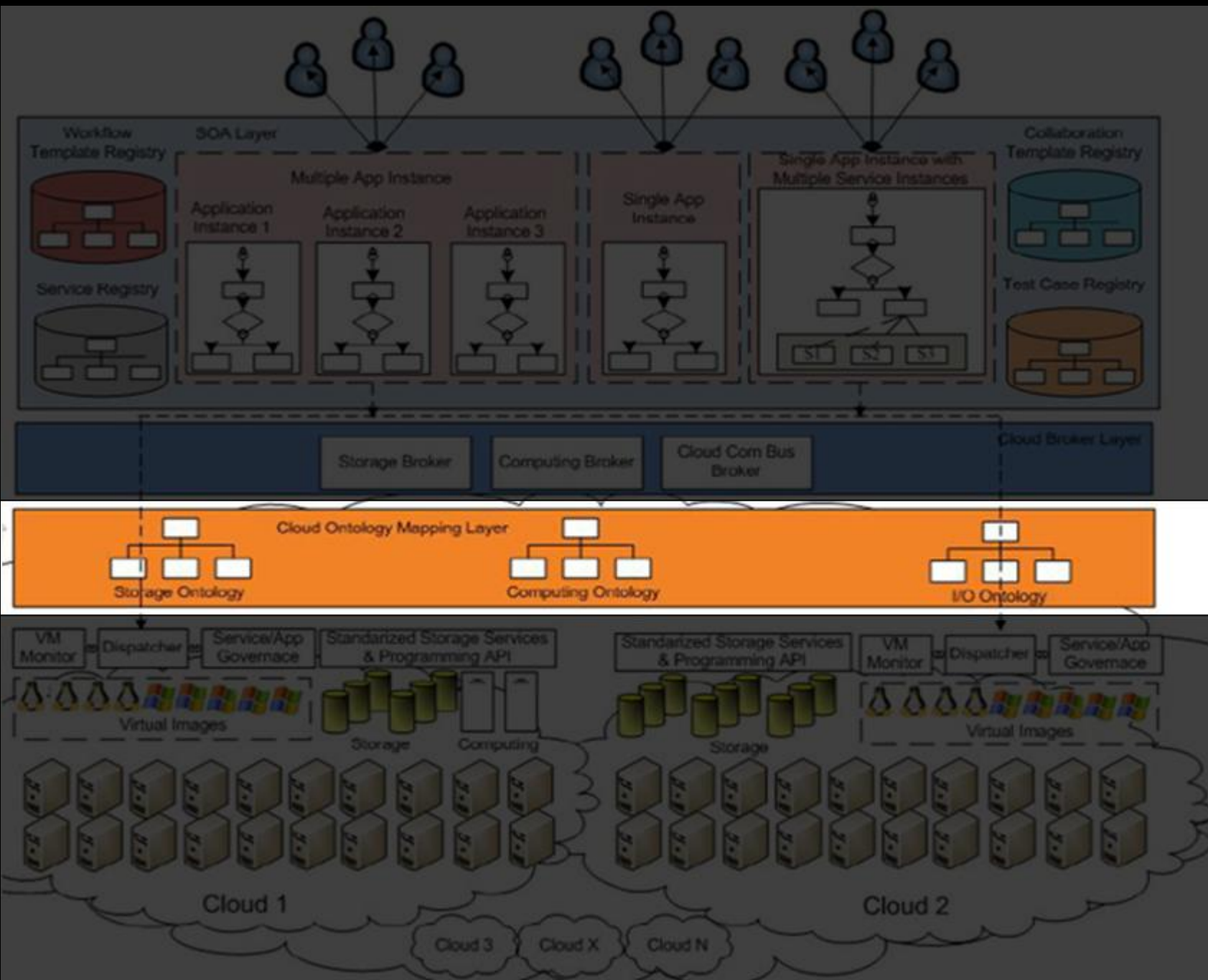
SOCCA Layers

- Layer 1
 - Cloud provider Layer
 - This layer is each individual clouds hardware and infrastructure
 - All cloud providers handle their own hardware and resources



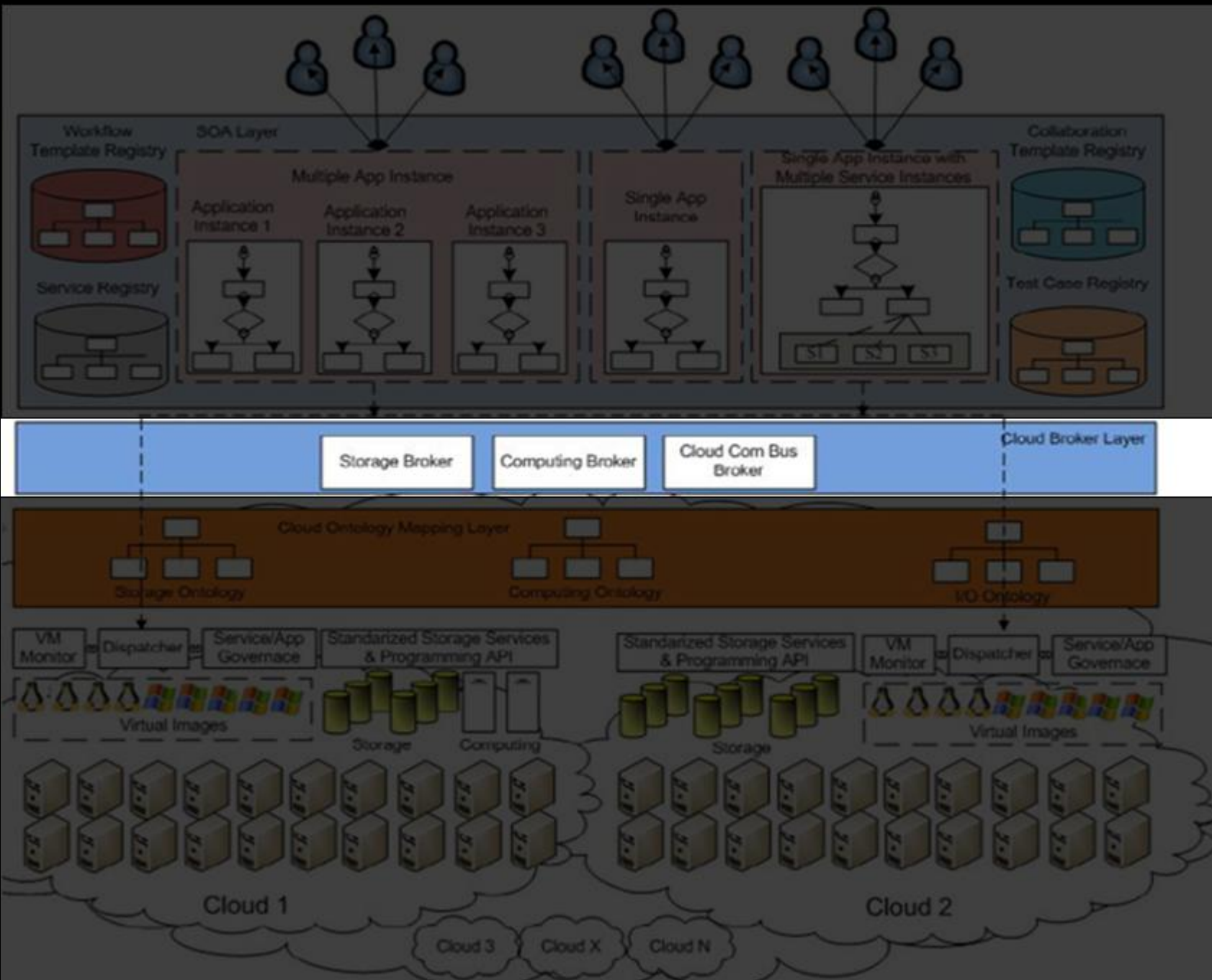
SOCCA Layers

- Layer 2
 - Cloud Ontology Mapping Layer
 - This layer consists of 3 ontologies
 - Storage Ontology- It defines concepts and terms related to data management
 - Computing Ontology- It defines concepts and terms related to distribution on the cloud
 - Communication Ontology- It defines concepts and terms related to communication schema



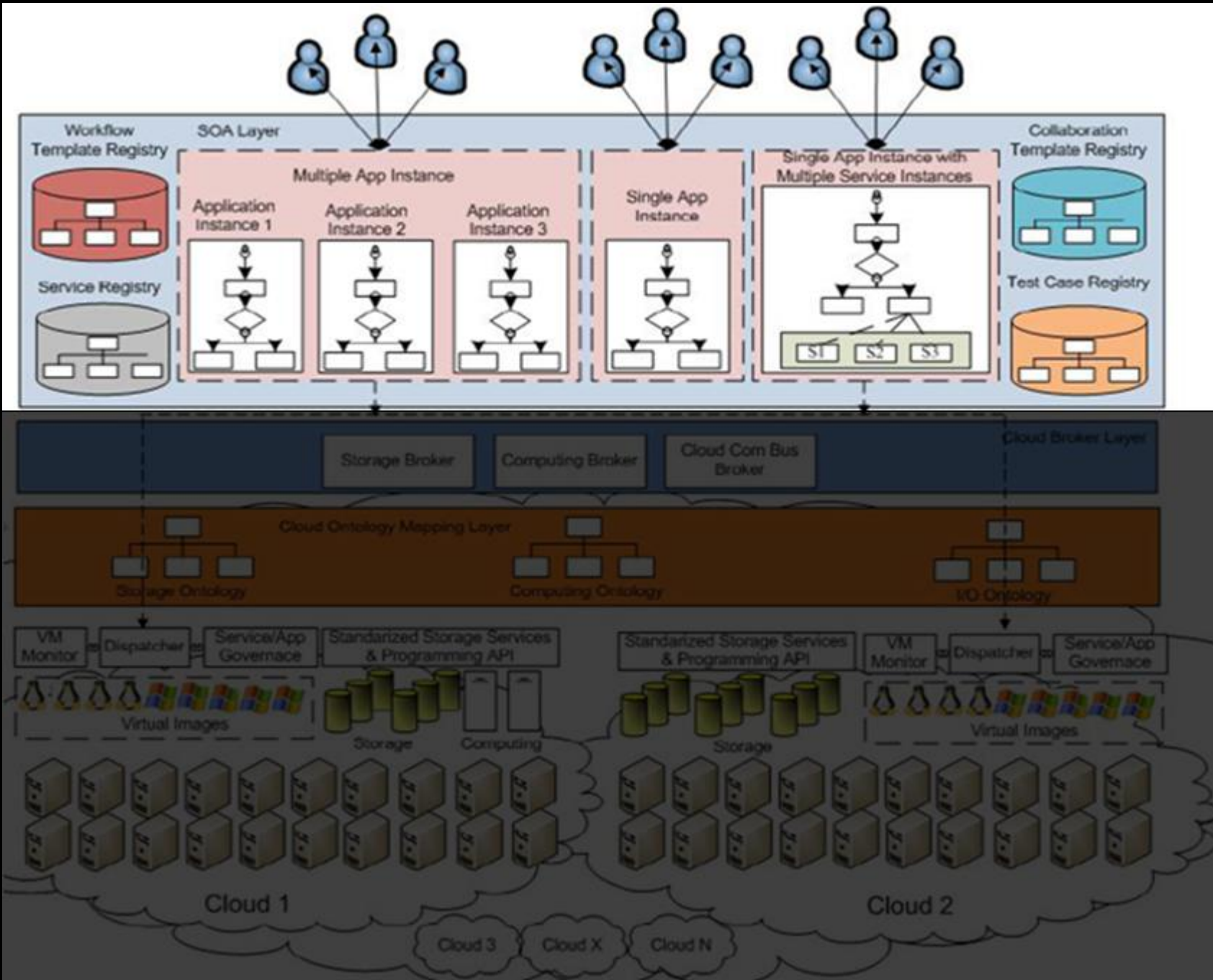
SOCCA Layers

- Layer 3
 - Cloud Broker Layer
 - This layer deals with individual cloud information
 - What the cloud provides
 - Prices
 - Rating of each individual cloud provider



SOCCA Layers

- Layer 4
 - SOA Layer
 - This layer deals with implementing the ideas of SOA
 - This layer is where the applications are run and the users see them.
 - Depending on the application it will be single tenancy or multitenancy



CCOA vs SOCCA

CCOA

- All Providers must work under the same platform
- Does not discuss Multitenancy
- Has been implemented

SOCCA

- Each individual provider handles their own servers and software
- Does have multitenancy support
- Only theoretical

Conclusion

- Cloud computing
 - SaaS, PaaS, IaaS
- Service Oriented Architecture
 - Two requirements of SOA
 - Multitenancy
- CCOA and SOCCA
 - Ideal concepts
 - A goal to strive for
 - Unlikely to be fully implemented

Bibliography

- Wei-Tek. Tsai, X. Sun, and J. Balasooriya. Service oriented cloud computing architecture.
- L.-J. Zhang and Q. Zhou. CCOA: Cloud computing open architecture.